TRENDS IN GENETICS
Volume 15

REFERENCE EDITION
1999

CONTENTS

JANUARY

Outlook

COMMENT

WNT targets: repression and activation by Roel Nusse 1

TGFβ inhibitors: new and unexpected requirements in vertebrate development
by William C. Smith 3

From complex traits to complex alleles
by Patrick C. Phillips 6

MEETING REPORTS

Bioinformatics in Siberia by Denis Thieffry and Gerald Z. Hertz 8

Gene regulation and cancer by Jerry L. Workman 9

LETTERS

Do unintended antisense transcripts contribute to sense co-suppression in plants?
by Richard A. Jorgensen, Qiudeng Que and Maike Stam 11

Reply by Andrew Fire and Mary Montgomery 12

JOURNAL CLUB

• New genes? Possibly, MABy... • Stay hungry • Regulating *Hox* genes • Prions – what a strain... 13

Reviews

Taking the plunge: terminal differentiation in *Dictyostelium*
by Peter Thomason, David Traynor and Robert Kay 15

Neural induction: a bird's eye view
by Andrea Streit and Claudio D. Stern 20

mRNA degradation: a tale of poly(A) and multiprotein machines
by Agamemnon J. Carpousis, Nathalie F. Vanzo and Lelia C. Raynal 24

Feasting, fasting and fermenting: glucose sensing in yeast and other cells
by Mark Johnston 29

The DNA methylation paradox
by Peter A. Jones 34

Resource

INTERNET

The Genome Channel: a browser to a uniform first-pass annotation of genomic DNA
by Richard J. Mural, Morey Parang, Manesh Shah, Jay Snoddy and Edward C. Uberbacher 38

E-mail networking in science: The DNA Methylation Society by Melanie Ehrlich 39

BOOK AND JOURNAL REVIEWS

Mutation Detection: A Practical Approach (R.G.H. Cotton, E. Edkins and S. Forrest, eds)
by Graham Taylor 39

Community Genetics (Leo ten Kate, editor in chief) by Angus J. Clarke 40

Genome Analysis: A Laboratory Manual (Vol. 1) Analyzing DNA; (Vol. 2) Detecting Genes (B. Birren *et al.*, eds)
by Johanna M. Rommens 41

Erratum: Evidence for massive gene exchange between archaeal and bacterial hyperthermophiles
by L. Aravind, Roman L. Tatusov, Yuri I. Wolf, D. Roland Walker and Eugene Koonin 41

FEBRUARY

Outlook

COMMENT

New lines of host defense: inhibition of Ty1 retrotransposition by Fus3p and NER/TFIIH
by M. Joan Curcio and David J. Garfinkel 43

MEETING REPORT

Mendel stayed home by Andrew P. Feinberg 46

LETTER

Why are human G-protein-coupled receptors predominantly intronless? by Andrew J. Gentles and Samuel Karlin 47

JOURNAL CLUB

• Cambrian explosion • Far out • Making connections with mitochondria? • PML and the dance of death 49

Special Review

How the worm was won: the *C. elegans* genome sequencing project
by The *C. elegans* Genome Consortium 51

Reviews

Teeth – where and how to make them
by Heiko Peters and Rudi Balling 59
It's a noisy business! Genetic regulation at the nanomolar scale
by Harley H. McAdams and Adam Arkin 65
Upheaval in the bacterial nucleoid: an active chromosome segregation mechanism
by Michaela E. Sharpe and Jeff Errington 70

Perspective

RNA surveillance: unforeseen consequences for gene expression, inherited genetic disorders and cancer
by Michael R. Culbertson 74

Resource

INTERNET

Finding a mouse: the International Mouse Strain Resource (IMSR) by Janan T. Eppig and Mark Strivens 81
Correction: The MITOP database – a one-stop shop for mitochondrial information
by Curt Scharfe, Paolo Zaccaria, Hans-Werner Mewes and Thomas Meitinger 81
Technical Tips Online 82

BOOK REVIEWS

Interpreting DNA evidence: Statistical Genetics for Forensic Scientists (I. W. Evett and B.S. Weir)
by John Brookfield 83
Genetic Instabilities and Hereditary Neurological Diseases (Robert D. Wells and Stephen T. Warren, eds)
by Marion Hamshere 83
The Crucible of Creation: The Burgess Shale and the Rise of Animals (Simon Conway Morris) by Gregory A. Wray 84

MARCH

Outlook

COMMENT

Plant genomics takes root, branches out
by Jeffrey L. Bennetzen 85
Gene targeting and somatic cell genetics: a rebirth or a coming of age?
by John M. Sedivy and Annie Dutriaux 88
Mitochondrial DNA – all things bad?
by Robert N. Lightowlers, Howard T. Jacobs and Olli A. Kajander 91

MEETING REPORT
The high cost of living 93
by Thomas A. Kunkel

LETTERS
Sinister depictions of DNA 95
by Frank Schneider, Peter Droege and Benno Mueller-Hill
Mono-allelic expression of genes in simple eukaryotes 95
by Piet Borst and Inês Chaves

JOURNAL CLUB
• Viruses making plants greener • Baroque imprints • Lofty insulation • Turn back the clock 96

Reviews

Making sense of the COP9 signalosome: a regulatory protein complex conserved from *Arabidopsis* to human
by Ning Wei and Xing-Wang Deng 98
Animal evolution: the end of the intermediate taxa?
by André Adoutte, Guillaume Balavoine, Nicolas Lartillot and Renaud de Rosa 104
Telomerase activation: one step on the road to cancer?
by Carol W. Greider 109
Neuronal guidance: a genetic perspective
by Guy Tear 113

Resource

INTERNET
Towards an *in silico* analysis of transcription patterns
by Stefania Bortoluzzi and Gian Antonio Danieli 118
Technical Tips Online 120

BOOK REVIEW
Genetics and Analysis of Quantitative Traits (Michael Lynch and Bruce Walsh)
by Mary L. Marazita 120

APRIL

Outlook

COMMENT
Revising the selfish DNA hypothesis: new evidence on accumulation of transposable elements in heterochromatin by Patrizio Dimitri and Nikolaj Junakovic 123
Proteolipid protein gene: Pelizaeus–Merzbacher disease in humans and neurodegeneration in mice
by Karen Woodward and Sue Malcolm 125
Cryopreservation of mouse spermatozoa: double your mouse space
by Susan Marschall and Martin Hrabé de Angelis 128

GENOME ANALYSIS
Why genome analysis? by Eugene Koonin 131
Errors in genome annotation by Steven E. Brenner 132
Molecular evolutionary evidence that *H19* mRNA is functional by Laurence D. Hurst and Nick G.C. Smith 134

MEETING REPORTS
An ethical collaboration by Bev R. Clucas 135
Expressive genomics by Françoise Fougerousse and Michel Vekemans 137

LETTER
Are scs and scs' 'neutral' chromatin domain boundaries of the *87A7* locus *in vivo*?
by Zoya Avramova and Alexander Tikhonov 138

JOURNAL CLUB
• *Pseudomonas* pathogenicity • DPP on the *brinker* • Whatever turns you on? 139

Reviews

Non-conventional infectious elements in filamentous fungi
by Philippe Silar and Marie-Josée Daboussi 141
Signaling specificity: the RTK/RAS/MAP kinase pathway in metazoans
by Patrick B.O. Tan and Stuart K. Kim 145
Chemosensation: molecular mechanisms in worms and mammals
by Brinda C. Prasad and Randall R. Reed 150
T-box genes: what they do and how they do it
by Jim Smith 154

Resource

INTERNET

Comparison of gene indexing databases by John Bouck, Wei Yu, Richard Gibbs and Kim Worley 159
Technical Tips Online 162

BOOK REVIEWS

The Human Genome: A User's Guide (R. Scott Hawley and Catherine A. Mori) by Norman A. Johnson 162
Epigenetics (Novartis Foundation Symposium 214) (edited by D.J. Chadwick and G. Cardew) by Tom Moore 163

MAY

Outlook

ANNOUNCEMENT

Online access to *Trends in Genetics* 165

COMMENT

A surfeit of *RAD51*-like genes?
by John Thacker 166
Too late for the midwife toad: stress, variability and Hsp90
by Anne McLaren 169

OBITUARY

From flowers to fish
by Jim Smith 172

GENOME ANALYSIS

Rickettsiae and Chlamydiae: evidence for horizontal gene transfer and gene exchange
by Yuri I. Wolf, L. Aravind and Eugene V. Koonin 173

MEETING REPORTS

Genes for ageing?
by Richard A. Miller 175
Mouse models for cancer at center stage
by Anton Berns 177

JOURNAL CLUB

• **Mediating activation** • **Hailing a taxi on the plant RNA superhighway** 178

Reviews

Molecular genetics of acute promyelocytic leukemia
by Richard J. Lin, David A. Egan and Ronald M. Evans 179
A fly's eye view of biology
by Barbara J. Thomas and David A. Wassarman 184
Lens biology: development and human cataractogenesis
by Peter J. Francis, Vanita Berry, Anthony T. Moore and Shomi Bhattacharya 191
Evolutionary change in the functional specificity of genes
by Andreas Eizinger, Benno Jungblut and Ralf J. Sommer 197

Resource

INTERNET

Genome expression on the World Wide Web
by Ezra G. Jennings and Richard A. Young 202
Technical Tips Online 204

BOOK REVIEWS

The Genetic Gods. Evolution and Belief in Human Affairs (J.C. Avise)
by Charles J. Epstein 204
At the Bench, A Laboratory Navigator (Kathy Barker)
by Shirley Lowe 205

JUNE

Outlook

COMMENT

Deafness genes: expressions of surprise
by Karen P. Steel and Tracy J. Bussoli 207
The small, the large, and the wild: the value of comparision in plant genomics
by Michael Bevan and George Murphy 211

GENOME ANALYSIS

***Pax* genes in *Caenorhabditis elegans*: a new twist**
by Oliver Hobert and Gary Ruvkun 214
A potential imprint control element: identification of a conserved 42 bp sequence upstream of *H19*
by Mathias A.E. Frevel, Jorrit J. Hornberg and Anthony E. Reeve 216

MEETING REPORTS

Going to extremes
by Jonathan A. Eisen 218
Computer science and meta-evolution
by Nancy A. Forbes and Laura F. Landweber 220

JOURNAL CLUB

• Ancient molecular parasites • DM: no longer alone • From p53 to p63 and p73 • Polyglutamine diseases 221

Perspective

The origin of the genetic code: amino acids as cofactors in an RNA world
by Eörs Szathmáry 223

Reviews

NF-κB to the rescue: RELs, apoptosis and cellular transformation
by Shi Yin Foo and Garry P. Nolan 229
Early steps in pituitary organogenesis
by Hui Z. Sheng and Heiner Westphal 236
Mouse autosomal trisomy: two's company, three's a crowd
by Diana Hernandez and Elizabeth M.C. Fisher 241

Resource

INTERNET

Zebrafish in the Net
by Monte Westerfield, Eckehard Doerry and Sarah Douglas 248
Technical Tips Online 249

BOOK REVIEW

Recombinant DNA Principles and Methodologies (edited by James J. Greene and Venigalla B. Rao) and Molecular Biomethods Handbook (edited by Ralph Rapley and John M. Walker)
by Stanley Maloy and Robert Edwards 250

JULY

Outlook

COMMENT

UFD1L and CDC45L: a role in DiGeorge syndrome and related phenotypes?
by Giuseppe Novelli, Francesca Amati and Bruno Dallapiccola 251
Reply: role of the dHAND–UFD1L pathway
by Deepak Srivastava and Hiroyuki Yamagishi 253

GENOME ANALYSIS

Inferring the direction of evolutionary changes of genomic base composition
by Matthew I. Bellgard and Takashi Gojobori 254

MEETING REPORTS

Bioinformatics for all!
by Michael Y. Galperin 257
Cutting in a lipid bilayer?
by G. William Rebeck 258

JOURNAL CLUB

• **Dominatrix disappears?** • ***YABBY* genes in plants** • **PKB starts to jump** 259

Reviews

Suppression mechanisms: themes from variations
by Gregory Prelich 261
Monogenic traits are not simple: lessons from phenylketonuria
by Charles R. Scriver and Paula J. Waters 267

Perspectives

Cell fate and organogenesis in bacteria
by Dale Kaiser 273
The evolution of new structures: clues from plant cytoskeletal genes
by Richard B. Meagher, Elizabeth C. McKinney and Angela V. Vitale 278

Resource

INTERNET

Making effective use of human genomic sequence data
by Wonhee Jang, Hsiu-Chuan Chen, Hugues Sicotte and Gregory D. Schuler 284

BOOK REVIEWS

Molecular Genetic Analysis of Populations: A Practical Approach (2nd edn) (A.R. Hoelzel)
by Robert McMahon 287
Genetics and the Social Behavior of the Dog (John Paul Scott and John L. Fuller)
by Mark Neff and Sabrina Hom 288
A Guide to Genetic Counseling (edited by D.L. Baker, J. Schuette and W. Uhlmann)
by Barbara Bowles Biesecker 288
The Development of Human Gene Therapy (Theodore Friedman)
by Nicholas R. Lemoine 289

AUGUST

Outlook

COMMENT

Host resistance to infection: genetic control of lipopolysaccharide responsiveness by TOLL-like receptor genes
by Salman T. Qureshi, Philippe Gros and Danielle Malo 291
The *Dictyostelium* genome project: an invitation to species hopping
by Robert R. Kay and Jeffrey G. Williams 294

GENOME ANALYSIS

Archaeal and bacterial hyperthermophiles: horizontal gene exchange or common ancestry?
by Nikos C. Kyrpides and Gary J. Olsen 298

Reply
by L. Aravind, Roman L. Tatusov, Yuri I. Wolf, D. Roland Walker and Eugene V. Koonin 299

MEETING REPORTS

The latest in signal transduction, 1999
by Eric Spana and Norbert Perrimon 301

The versatility of RNA structure and function
by Patrick Linder and Mick F. Tuite 302

LETTER

Many G-protein-coupled receptors are encoded by retrogenes
by Jürgen Brosius 304

JOURNAL CLUB

Why snakes don't have legs • Nervous phosphatases • NoneXistence 306

Perspective

Patterning the *C. elegans* embryo: moving beyond the cell lineage
by Michel Labouesse and Susan E. Mango 307

Reviews

Head in the WNT: the molecular nature of Spemann's head organizer
by Christof Niehrs 314

Compartment boundaries: at the edge of development
by Christian Dahmann and Konrad Basler 320

Resident aliens: the Tc1/*mariner* superfamily of transposable elements
by Ronald H.A. Plasterk, Zsuzsanna Izsvák and Zoltán Ivics 326

Resource

INTERNET

The Interactive Fly: gene networks, development and the Internet by Thomas Brody 333

Technical Tips Online 335

BOOK REVIEWS

A History of Molecular Biology (Michel Morange) by Robert Olby 335

Prions: Molecular and Cellular Biology (edited by David A. Harris) by Yury O. Chernoff 336

Erratum: Inferring the direction of evolutionary changes of genomic base composition by Matthew I. Bellgard and Takashi Gojobori 336

SEPTEMBER

Outlook

COMMENT

Multi-organellar disorders of pigmentation: intracellular traffic jams in mammals, flies and yeast
by Richard A. Spritz 337

The best yeast?
by Susan L. Forsburg 340

GENOME ANALYSIS

Gene-cluster analysis in chloroplast genomics
by Bettina Stoebe and Klaus V. Kowallik 344

Evolution of a conserved protein module from *Archaea* to plants
by Andrei D. Shutov, Frank R. Blattner and Helmut Bäumlein 348

MEETING REPORTS

Repeat meeting's repeat performance
by Albert R. La Spada 350

Genomics and psychiatry
by Patrick J. Rogue and Daniel R. Weinberger 351

JOURNAL CLUB
The long arms of the cell • TGFβ signalling • Mice that can't get high • Novel floral patterns 352

Reviews

Bayesian statistics in genetics: a guide for the uninitiated
by Jennifer S. Shoemaker, Ian S. Painter and Bruce S. Weir 354
RNA-triggered gene silencing
Andrew Fire 358

Perspectives

Why have organelles retained genomes?
by Helen L. Race, Reinhold G. Herrmann and William Martin 364
Pax 6: mastering eye morphogenesis and eye evolution
by Walter J. Gehring and Kazuho Ikeo 371

Resource

INTERNET
Internet resources for the functional analysis of 5′ and 3′ untranslated regions of eukaryotic mRNAs
by Graziano Pesole and Sabino Liuni 378
It's a knockout!
by Anna V. Anagnostopoulos 379

BOOK REVIEWS
The RNA World: The Nature of Modern RNA Suggests a Prebiotic RNA (2nd Edn) (edited by R.F. Gesteland, T.R. Cech and J.F. Atkins) by B.E.H. Maden 380
Genomics: The Science and Technology Behind the Human Genome Project by Charles R. Cantor and Cassandra L. Smith 381

OCTOBER

Outlook

COMMENT
An eXceptional chromosome
by Laurence D. Hurst and James P. Randerson 383
Tumors in tadpoles: the *Xenopus* embryo as a model system for the study of tumorigenesis
by John B. Wallingford 385

GENOME ANALYSIS
Alternative splicing of human genes: more the rule than the exception?
by Jens Hanke, Dave Brett, Inga Zastrow, Atakan Aydin, Sebastian Delbrück, Gerritt Lehmann, Friedrich Luft, Jens Reich and Peer Bork 389

MEETING REPORTS
Forcing evolution
by Richard H. Thomas 390
Plant genomics and the genetics of disease resistance
by Andreas Graner, Thomas Lahaye and Beat Keller 391

LETTER
Homeotic transformation in a centipede
by Chris Kettle, Wallace Arthur, Trevor Jowett and Alessandro Minelli 393

JOURNAL CLUB
Sperm tales • YAC transgenic model of Alzheimer disease • Telomere proteins take a break • Codon-preference riddles 394

Reviews

Morphogen gradients: new insights from DPP
by Steven D. Podos and Edwin L. Ferguson 396
Locus control regions: coming of age at a decade plus
by Qiliang Li, Susanna Harju and Kenneth R. Peterson 403
Genetics of limb anomalies in humans
by Sylvie Manouvrier-Hanu, Muriel Holder-Espinasse and Stanislas Lyonnet 409
Gli proteins and Hedgehog signaling: development and cancer
by Ariel Ruiz i Altaba 418

Resource

INTERNET

Internet access to the *C. elegans* genome
by Lincoln D. Stein 425

BOOK REVIEWS

Down Syndrome. A Promising Future, Together (by Terry J. Hassold and David Patterson) by John Tolmie 427

NOVEMBER

Outlook

COMMENT

The mahogany mouse mutation: further links between pigmentation, obesity and the immune system
by Ian J. Jackson 429
Genomic imprinting in mammals: an interplay between chromatin and DNA methylation?
by Robert Feil and Sanjeev Khosla 431
Copying out our ABCs: the role of gene redundancy in interpreting genetic hierarchies
by Rob Martienssen and Vivian Irish 435

GENOME ANALYSIS

Small introns tend to occur in GC-rich regions in some but not all vertebrates
by Laurence D. Hurst, Clair F.A. Brunton and Nicholas G.C. Smith 437
A conserved RNA structure element involved in the regulation of bacterial riboflavin synthesis genes
by Mikhail. S. Gelfand, Andrey A. Mironov, Jurges Jomantas, Yuri I. Kozlov and Danila A. Perumov 439

MEETING REPORTS

The molecular clock is gone but not forgotten
by Rasmus Nielsen 442
Broke? Change your partner? Rejoin?
by David J. Sherratt and François-Xavier Barre 443

LETTER

Orthology: another terminology muddle
by Christos Ouzounis 445

JOURNAL CLUB

GDNF and BMP7 in early kidney development • Sex, drugs and mitochondria • *Drosophila* sperm and the fight to fertilize 446
ERRATUM: TGFβ signalling by Alison Snape 446

Reviews

Singling out *Drosophila* tendon cells: a dialogue between two distinct cell types
by Talila Volk 448
Guilt by association: non-coding RNAs, chromosome-specific proteins and dosage compensation in *Drosophila*
by Carsten Stuckenholz, Yuji Kageyama and Mitzi I. Kuroda 454
Ci: a complex transducer of the Hedgehog signal
by Pedro Aza-Blanc and Thomas B. Kornberg 458
Genetic approaches to memory storage
by Mark Mayford and Eric R. Kandel 463

Resource

INTERNET

What's new in the library? What's new in GenBank? Let PubCrawler tell you by Karsten Hokamp and Ken Wolfe 471

BOOK REVIEWS

Heart Development (edited by Richard P. Harvey and Nadia Rosenthal) by Antonio Baldini 472
Automation: Genome and Functional Analyses, Methods in Microbiology (Vol. 28) (edited by A.G. Craig and J.D. Hoheisel) by Spyro Mousses 473
Breast Cancer: Molecular Genetics, Pathogenesis, and Therapeutics (edited by A.M. Bowcock) by Kornelia Polyak 473
The Anatomical Basis of Mouse Development (by M.H. Kaufman and J.B.L. Bard) by Brigid Hogan 474

DECEMBER

MILLENNIUM ISSUE

A special joint issue from *Trends in Cell Biology, Trends in Biochemical Sciences and Trends in Genetics*

Editorial: A joint millennium issue by Deborah Sweet, Mary Purton and Jane Alfred M1
Millennium bugs by Julian Davies M2
Lateral genomics by W. Ford Doolittle M3
Constructing an RNA world by David P. Bartel and Peter J. Unrau M9
Human evolution by Svante Pääbo M13
The genetics of complex diseases by Glenys Thomson and Michael S. Esposito M17
Challenges at the frontiers of structural biology by Andrej Šali and John Kuriyan M20
Opportunities at the interface of chemistry and biology by Andrew B. Martin and Peter G. Schultz M24
Deconstructing membrane traffic by Regis B. Kelly M29
Cell adhesion: old and new questions by Richard O. Hynes M33
Millennial musings on molecular motors by Ronald D. Vale M38
Intracellular proteolysis by Marc Kirschner M42
Eukaryotic transcriptional control by Roger D. Kornberg M46
Death by design: mechanism and control of apoptosis by Zhiwei Song and Hermann Steller M49
Signalling networks that cause cancer by Frank McCormick M53
Genetic instability and darwinian selection in tumours by Daniel P. Cahill, Kenneth W. Kinzler, Bert Vogelstein and Christoph Lengauer M57
Pattern formation in single cells by Joshua M. Shulman and Daniel St Johnston M60
Plants, animals and the logic of development by Elliot M. Meyerowitz M65
The origin and evolution of segmentation by Gregory K. Davis and Nipam H. Patel M68
Are our universities producing too many PhDs? by Bruce M. Alberts M73

AUTHOR INDEX 475

SUBJECT INDEX 481

INDEX OF BOOKS REVIEWED 487